

SECTION II—CLAIMS

1. (Original) An apparatus comprising:
 - a substrate including a plurality of conducting layers; and
 - a nanocomposite inter-layer dielectric (ILD) sandwiched between the conducting layers, wherein the nanocomposite ILD layer comprises a nanocomposite including a polymer having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio.
2. (Original) The apparatus of claim 1 wherein the nanoclay particles have an aspect ratio greater than about 50.
3. (Original) The apparatus of claim 1 wherein the nanoclay particles have an aspect ratio greater than about 200.
4. (Original) The apparatus of claim 1 wherein the nanoclay particles are platelets or tactoids.
5. (Original) The apparatus of claim 1 wherein the nanocomposite comprises less than 25 percent by weight of nanoclay particles.
6. (Original) The apparatus of claim 5 wherein the nanocomposite comprises less than 10 percent by weight of nanoclay particles.
7. (Original) The apparatus of claim 6 wherein the nanocomposite comprises less than 5 percent by weight of nanoclay particles.
8. (Original) The apparatus of claim 7 wherein the nanocomposite comprises less than ½ percent by weight of nanoclay particles.

9. (Original) The apparatus of claim 1 wherein the nanoclay comprises natural clays, synthetic clays, modified phyllosilicates, or combinations or blends thereof.
10. (Original) The apparatus of claim 1 wherein the polymer binder comprises a thermally curable polymer.
11. (Original) An apparatus comprising:
 - a substrate having a contact surface; and
 - a nanocomposite solder resist layer placed on the contact surface, wherein the solder resist comprises a nanocomposite including a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio.
12. (Original) The apparatus of claim 11 wherein the nanoclay particles have an aspect ratio greater than about 50.
13. (Original) The apparatus of claim 11 wherein the nanoclay particles have an aspect ratio greater than about 200.
14. (Original) The apparatus of claim 11 wherein the nanoclay particles are platelets or tactoids.
15. (Original) The apparatus of claim 11 wherein the nanocomposite comprises less than 25 percent by weight of nanoclay particles.
16. (Original) The apparatus of claim 15 wherein the nanocomposite comprises less than 10 percent by weight of nanoclay particles.
17. (Original) The apparatus of claim 16 wherein the nanocomposite comprises less than 5 percent by weight of nanoclay particles.

18. (Original) The apparatus of claim 17 wherein the nanocomposite comprises less than $\frac{1}{2}$ percent by weight of nanoclay particles.
19. (Original) The apparatus of claim 11 wherein the nanoclay comprises natural clays, synthetic clays, modified phyllosilicates, or combinations or blends thereof.
20. (Original) The apparatus of claim 11 wherein the polymer binder comprises a thermally curable polymer.
21. (Original) The apparatus of claim 11 wherein the polymer binder comprises a photo-curable polymer.
22. (Original) The apparatus of claim 11 wherein the substrate comprises:
 - a plurality of conducting layers; and
 - a nanocomposite inter-layer dielectric (ILD) sandwiched between the conducting layers, wherein the nanocomposite ILD layer includes a nanocomposite comprising a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio.
23. (Original) A system comprising:
 - a substrate having a contact surface;
 - a nanocomposite solder resist layer placed on the contact surface, wherein the solder resist comprises a nanocomposite including a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio;
 - and

a die attached to and in electrical contact with the contact surface, the die being attached using solder deposited in holes in the nanocomposite solder resist layer.

24. (Original) The system of claim 23 wherein the nanoclay particles have an aspect ratio greater than about 50.
25. (Original) The system of claim 23 wherein the nanoclay particles have an aspect ratio greater than about 200.
26. (Original) The system of claim 23 wherein the nanoclay particles are platelets or tactoids.
27. (Original) The system of claim 23 wherein the nanocomposite comprises less than 25 percent by weight of nanoclay particles.
28. (Original) The system of claim 27 wherein the nanocomposite comprises less than 10 percent by weight of nanoclay particles.
29. (Original) The system of claim 28 wherein the nanocomposite comprises less than 5 percent by weight of nanoclay particles.
30. (Original) The system of claim 29 wherein the nanocomposite comprises less than ½ percent by weight of nanoclay particles.
31. (Original) The system of claim 23 wherein the nanoclay comprises natural clays, synthetic clays, modified phyllosilicates, or combinations or blends thereof.
32. (Original) The system of claim 23 wherein the polymer binder comprises a thermally curable polymer.
33. (Original) The system of claim 23 wherein the polymer binder comprises a photo-curable polymer.

34. (Original) The system of claim 23 wherein the substrate comprises:

a plurality of conducting layers; and

a nanocomposite inter-layer dielectric (ILD) sandwiched between the conducting layers, wherein the nanocomposite ILD layer includes a nanocomposite comprising a polymer binder having a plurality of nanoclay particles dispersed therein, the nanoclay particles having a high aspect ratio.

35.-56. (Canceled)